Transformation of accounting through digital standardisation

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Transformation of accounting through digital standardisation: tracing the construction of the IFRS Taxonomy

Abstract

Purpose: Corporate reporting infrastructure and communication are being transformed by the emergence of digital technologies. A key element of the digital accounting infrastructure underpinning international corporate reporting is the IFRS Taxonomy, a digital representation of international accounting standards that is required by firms to produce digital corporate reports. This paper traces the development, governance and adoption of the IFRS Taxonomy to highlight the implications for accounting practice and standard-setting.

Design/methodology/approach: We mobilise Actor Network Theory and a model of transnational standardisation to analyse the process surrounding the formation and diffusion of the IFRS Taxonomy as a legitimate 'reference' of the IFRS Standards. We trace the process using interview, observation and documentary evidence.

Findings: The analysis shows that while the Taxonomy enables IFRS-based reporting in the digital age, tensions and detours result in the need for a realignment of the perspectives of both accounting standard-setters and taxonomy developers that have transformative implications for accounting practice and standard-setting.

Originality/value: The study explains how and why existing accounting standards are transformed by technology inscriptions with reflexive effects on the formation and diffusion of accounting standards. In doing so, the paper highlights the implications that arise as accounting practice adapts to the digitalisation of corporate reporting.

Keywords: IFRS, IFRS Taxonomy, standards, standardisation, actor network theory, circulating reference, translation, XBRL

1. Introduction

Over recent decades, there has been significant activity to advance digital corporate reporting (Bonsón et al., 2009; Guilloux et al., 2013; Troshani et al., 2015). As leading regulators are increasingly mandating firms to digitally file their corporate reports, the IFRS Foundation has been proactive in creating a technological 'standard', the IFRS Taxonomy that enables preparers and users to continue to use IFRS Standards[1] in the digital realm (IFRSF, 2016a). The IFRS Taxonomy is a dictionary of digital tags. It formalises and structures reporting disclosures based on IFRS Standards, and is an essential mechanism needed to create digital corporate reports (IFRSF, 2015a, 2016b).

The combination of the IFRS Standards and digital tagging technology creates a nested standard that embodies the standardisation processes of its component parts and creates new tensions between the technologies and human actors (Lampland & Star, 2009). The IFRS Standards provide the digital tagging technology with access to an established network of users. This synergistic relationship between the standards and the digital tagging is also

[1] The term 'IFRS Standards' is used to refer to those accounting standards released by the International Accounting Standards Board (IASB) designated as IAS or IFRS (IFRSF, 2015b). The IFRS Standards are distinct from the IFRS Taxonomy, the technological device required to create digital corporate reports based on IFRS Standards.

important to the IFRS Foundation, as the US SEC and other national regulators require preparers to file 'tagged' corporate reports (ESMA, 2016; USSEC, 2017). Without an IFRS Taxonomy accepted for use by regulators, dual listed companies would not be able to file using IFRS Standards as foreign filers because they would not be able to meet the requirement to file digital (tagged) reports. Prospects for convergence of IFRS with US GAAP could be curtailed by incompatibility between the jurisdictions' taxonomies (Casey, 2007; IFRSUSA, 2011).

Despite the trials of strength arising from tensions between IFRS and digital tagging standards it is in the best interests of both that the IFRS Taxonomy be perceived as legitimate (Dillard et al., 2004; Suchman, 1995). In Latour's (1999b) framing, the Taxonomy must faithfully represent the IFRS Standards to become a 'circulating reference', accepted as legitimate and useful. Botzem & Dobusch (2012) argue that transnational standards are recursively developed through a process of achieving input and output legitimacy. The two theoretical perspectives together provide a basis for a more textured view of the standardisation process involved in the development of the IFRS Taxonomy and insights into implications for standard-setting in accounting and practice.

Our examination of the process of IFRS Taxonomy standardisation and its effects is timely in the context of 'big data' impacts on corporate reporting (Al-Htaybat & Alberti-Alhtaybat, 2017), and in particular given recent decisions of regulators in the EU and US concerning the use of IFRS Taxonomy. In December 2016, the European Securities and Markets Authority (ESMA) announced that EU-listed firms will be required to tag corporate IFRS reports using the IFRS Taxonomy from January 2020 (ESMA, 2016). In March 2017, US Securities and Exchange Commission (SEC) decided to allow foreign private firms to use the IFRS Taxonomy to publish IFRS-based corporate reports (USSEC, 2017).

We analyse how the IFRS Taxonomy is constructed so that it is aligned with the IFRS Standards and also meets the needs of preparers and other users. We observe how the IFRS Taxonomy has become a useful tool for the standard-setter and some regulators and preparers. We contribute by addressing two research questions: *i) what mechanisms and tensions are shaping the IFRS Taxonomy as an authentic representation of the IFRS Standards? (ii) what is lost and gained during the transformation of the IFRS Standards into a digital representation?*

To address these questions, we mobilise the circulating reference and translation concepts from Actor Network Theory (ANT) (Callon, 1986b; Latour, 1999b) to extend the process focus of Botzem & Dobusch's (2012) reflexive model. ANT focuses on how knowledge comes to be constructed. The IFRS Taxonomy can be conceptualised as a reference that moves the IFRS Standards, the referent, into the digital space. The IFRS Taxonomy can be said to be a circulating reference, legitimate for its purpose, if the transformation from IFRS Standards to the Taxonomy is traceable by key actors who are persuaded that it is a faithful representation of the referent (Latour, 1999b). We focus on the strategies and mechanisms adopted to engage supporters of IFRS Standards with the Taxonomy to improve its inclusiveness and analyse how and why these are being effective in attracting the support of some key actors, but not others (Lampland & Star, 2009).

We extend the theory relating to standardisation using the concept of circulating reference and analyse the implications of digital standardisation for accounting standard-setting and

practice. The context of our study is the supra-national standardisation of a digital representation. This entails significant co-ordination and engagement issues of a different nature and scope to inscriptions in individual firms that are the subject of most prior research (Botzem & Hofmann, 2010; IFRSF, 2016i).

The IASB is the accounting standard-setting body of the IFRS Foundation which is established as a private not-for-profit foundation (IFRSF, 2016h). Although the IASB has become highly influential globally, it cannot rely on regulation or use binding force of the law to enforce IFRS Taxonomy adoption (IFRSF, 2012c; Zeff, 2012). 'Private' supra-national standard-setting bodies, such as the IASB, GRI, IIRC[2] and XBRL International Inc. (XII) provide national regulators and private companies with 'ready-made' standards so it is important to understand the dynamics of network enrolment as they seek to legitimise their standards (Rowbottom & Locke, 2016).

Qualitative evidence is drawn from thirty-two interviews with standard-setting actors, observation and publicly available documentation including minutes of meetings, position papers, audio/visual recordings of meetings concerning the construction of the IFRS Taxonomy at the IFRS Foundation.

This analysis contributes to the scarce empirical literature on standardisation in accounting by showing the process by which a private standard-setter, the IASB, operating in a densely populated regulatory space (Botzem & Hofmann, 2010), seeks to construct a digital representation of its own standards as a means to maintain their relevance and facilitate diffusion. This provides insights for regulators and policy-makers who have mandated or are considering mandating use of the IFRS Taxonomy in their jurisdictions (Botzem, 2012; Timmermans & Epstein, 2010).

This setting also allows us to contribute to standard-setting research by extending Botzem & Dobusch's (2012) recursive model of transnational standardisation to include a focus on the characteristics of the standard itself that are an essential factor in output legitimacy and which are implicated in the process of standard formation and input legitimacy. We focus on the complexity of this process in the context of the IFRS Taxonomy, highlighting intended and unintended consequences of that development (Lowe, 2004).

The paper is structured as follows. First, we examine the background of the key actors of this study, before discussing standardisation literature and the concepts of circulating reference and translation and their relevance in the context of the process model of transnational standardisation. We then explain the data collection and analysis before presenting our findings. Finally, the discussion section interprets the findings and presents the implications.

2. IFRS Standards, IFRS Taxonomy and XBRL

IFRS Standards constitute guidelines for composing corporate financial reports in terms of information required and the manner in which it needs to be presented (Botzem & Quack, 2006). The standards are both developed and maintained by the IASB, the standard-setting body of the IFRS Foundation. A key objective of the IFRS Foundation is to develop and

[2] International Integrated Reporting Council (IIRC) and Global Reporting Initiative (GRI).

promote IFRS Standards to provide firms around the world with a consistent and comparable way of preparing and presenting corporate reports (Botzem, 2012; IFRSF, 2013c).

IFRS Standards are based on principles that "offer little if any operational guidance" (Benston et al., 2006, p. 169) leaving it to adopting entities to make accounting choices that do not contravene the principles established in the standards.

The IFRS Taxonomy is an electronic 'data dictionary' that enables preparers to provide a digital representation of their IFRS-based corporate reports (IFRSF, 2015a). The IFRS Taxonomy defines a set of standard 'tags' based on disclosures expected by the IFRS Standards (IFRSF, 2016d).

Tagging data in corporate reports is desirable as it structures content to enable automated computer-based access to information at the granular data item level. Reporting and accessing data in this manner offers efficiencies over traditional forms of reporting (IFRSF, 2016b; Ramin & Reiman, 2013). It enables automation of analysis and communication of data unlike traditional formats that essentially recreate paper-based statements (e.g., PDF). The IFRS Taxonomy "facilitates effective digital communication by making IFRS financial statements more accessible (easier to ingest, process and analyse)" (Ogun-Clijmans & Krawiec, 2016) while reducing search costs (Arnold et al., 2012).

The IFRS Taxonomy has been developed using the XBRL (eXtensible Business Reporting Language) data standard (Teixeira, 2015). The XBRL specification provides rules and structure for both the IFRS Taxonomy and the digital format of IFRS-based corporate reports (Teixeira, 2013a). XBRL facilitates the 'tagging' process that associates contextual information with data points in corporate reports. The XBRL tags that are required for IFRS-based disclosures are defined in the IFRS Taxonomy (Table 1 (a)) (IASCF, 2008). When formatted with XBRL tags, corporate reports are called instance documents (Table 1 (b)).

TABLE 1. IFRS Taxonomy and instance document excerpts

IFRS Taxonomy excerpt (e.g., element definition)

```
…
<element
    id="ifrs_ProfitLossBeforeTax"
     name="ProfitLossBeforeTax"
     type="xbrli:monetaryItemType"
     xbrli:balance="credit"
     nillable="true"/>
…
```

(a)

IFRS instance document excerpt

```
…
<ifrs:ProfitLossBeforeTax
     unitRef="U-Euros"
     decimals="0">661000
</irfs:ProfitLossBeforeTax>
…
```

(b)

A feature of XBRL is its extensibility that allows preparers to create their own tags, known as extensions. This enables preparers to include information in their digital corporate reports which may be unique to their company's situation as is the intention of the principles-based IFRS Standards.

XBRL defines the architecture of a taxonomy including significant aspects such as: the design rationale, including the hierarchy of financial accounting concepts and disclosure requirements; presentation in human readable form; and formulae that define relationships between accounting concepts and disclosures (IFRSF, 2010).

XBRL is formally developed under the auspices of XII, a private consortium that oversees the evolution of the XBRL Specification (Doolin & Troshani, 2004). XBRL Specification 2.1 is considered to be stable for use in software applications for preparing and consuming digital financial reports (IFRSF, 2016f). The IASB is one of many members of XII that has contributed to the present form of XBRL (XII, 2016).

The limited research available shows that XBRL adoption has predominantly occurred in regulatory space, though stark differences can be observed in the pace of adoption between countries where XBRL was mandated (e.g., UK, US, Japan, China) (Shan & Troshani, 2014; Shan et al., 2015; Shan & Troshani, 2016; Troshani et al., 2015) and those where adoption remained voluntary (e.g., Australia, Netherlands) (de Winne et al., 2011; Doolin & Troshani, 2007; Troshani & Doolin, 2007; Troshani & Lymer, 2010).[3] These studies show that stakeholders became disillusioned and disengaged where XBRL fails to deliver expected benefits (Locke & Lowe, 2007). Taken together, prior research shows that the lack of a business case for voluntary XBRL adoption weakens diffusion unless mandated by regulators such as government agencies, stock exchanges.

XBRL is currently a key actor in the construction of the IFRS Taxonomy. The IFRS Foundation and XBRL form an important association as the widespread regulatory adoption of IFRS Standards provides a vehicle for increasing XBRL diffusion.[4] The symbiotic relationship is evident where the world's largest regulators such as the ESMA and US SEC have mandated digital reporting based on XBRL. The mandates, and the boost they provide to the diffusion of XBRL and IFRS Standards rely on the construction of the IFRS Taxonomy as a legitimate digital representation of IFRS Standards.

The IFRS Taxonomy is viewed as an assemblage of standards and technologies including the IFRS Standards, its supporting actor network and XBRL. It is a 'derivative standard' that is nested in other standards and infrastructure. The IFRS Taxonomy is formed by inscribing accounting concepts, rules, disclosures and additional prescriptions intended to discipline actors who use it to behave in similar ways and create uniformity across markets by digitally reporting their performance in IFRS-based corporate reports.

3. Theoretical underpinning

In this paper the transformative effects on accounting of the process of standardisation needed to enable digital reporting are theorised using ANT and Botzem & Dobusch's (2012) model of the recursive cycle of transnational standardisation. In this section, we explain our choice by first relating the standardisation literature to the research setting, then explaining the ANT concepts of circulating reference and translation, and finally by integrating the Botzem & Dobusch's (2012) model into the theoretical framework.

[3] In the Netherlands, Australia and the UK, XBRL was adopted as part of multi-agency initiatives that aimed to standardise business and tax reporting to government to reduce regulatory burdens on business. In Australia and Netherlands these initiatives are branded as Standard Business Reporting (SBR). In the US, Japan, China, and the UK, XBRL is used to facilitate the filing of corporate reports based on local accounting standards to registrars and stock exchanges. In the US the process is called 'interactive reporting'.

[4] A recent IFRS Foundation survey shows that of 143 surveyed jurisdictions 119 (83%) require IFRS Standards for most public-listed companies (IFRSF, 2015f, 2016a).

3.1 Standardisation and digital reporting

Standardisation is the process of constructing a "set of technical specifications adhered to by a set of producers, either tacitly or as a result of a formal agreement" (David & Greenstein, 1990, p. 4). The aim is to achieve uniformity and social order across time and space that is required for the effective communication of technical ideas in accounting and the interoperability needed for information communication technologies to work (Bonino & Spring, 1999; Botzem & Dobusch, 2012).

Standardisation requires complex interactions and the successful co-ordination of social and technical elements that nonetheless may have unexpected consequences (Hanseth et al., 2006; Timmermans & Epstein, 2010). Standards that become dominant in a field are powerful in shaping and constructing what is acceptable, what is communicated and who may be winners or losers (Camp & Vincent, 2004). It is important that the impact of specific organisational, political, and cultural circumstances on standardisation outcomes are researched (Storz, 2007).

> Standards transform by coordinating disparate elements, but the outcomes that standards achieve depend on the specific standards and the circumstances under which they are made to work (Timmermans & Epstein, 2010, p. 84).

Standardisation has been studied from different perspectives such as whether or not the process is accessible in the sense of 'open source developments'(Oshri et al., 2010) and whether standards are *de jure* or *de facto* (Egyedi & Koppenhol, 2010). In the accounting literature there is concern about the politics of standard-setting, particularly in the form of lobbying and the unequal power of stakeholders in the face of the privatisation of accounting standard-setting (Kwok & Sharp, 2005; Young, 2003, 2006; Rowbottom & Schroeder, 2014). The research consistently highlights the power of the standards and those who influence them, and emphasises the importance of understanding how standards come to be accepted (Cooper & Robson, 2006; Pelger, 2016; Richardson, 2009).

One focus of this sociological perspective is on the genesis of standards. It conceptualises standardisation as collective rule-making underpinned by political and normative dimensions and social negotiation (Schmidt & Werle, 1998). A dominant strand in this research has adopted a process-based approach that distinguishes between different standardisation stages. It examines the trajectory of standards as a process of recursive cycles of standard formation and diffusion (Botzem & Dobusch, 2012).

Formation is important because the manner in which a standard is initially constructed can have a deep impact on how it is subsequently diffused (Botzem & Quack, 2009). Since standards coordinate many different actors, the mode of actor participation constitutes an important part of standard formation (Zeff, 2012). Botzem & Dobusch (2012) dichotomise standard formation into exclusive approaches that rely on control, and inclusive approaches that rely on building a consensus.

An exclusive approach is typically undertaken by a single organisation acting unilaterally often generating proprietary standards.[5] Whilst formation of proprietary standards is

[5] Microsoft Windows desktop application is an example of a standard formed using the exclusive approach (Botzem & Dobusch, 2012).

generally straightforward, their legitimacy may be questioned or contested by prospective adopters (Dillard et al., 2004).

Inclusive standard formation is a multi-actor approach where many, often heterogeneous, actors participate. This can make the process of constructing standards difficult, but it encourages perceptions of legitimacy amongst prospective adopters and underpins wider acceptance (Botzem & Dobusch, 2012).

To illustrate, the IFRS Foundation[6] has undertaken structural and process changes to facilitate an inclusive approach to standard-setting in attempts to achieve legitimacy for IFRS Standards (Botzem, 2014; Kwok & Sharp, 2005). It was transformed from a meta-organisation comprised of representatives of national standard-setting bodies, into a private not-for-profit foundation comprised of international experts. In attempts to ensure inclusive participation and transparency, the IFRS Foundation constructs IFRS Standards by relying on a formal and rigorous due process to engage and consult with the business community and national regulators (Botzem, 2014; IFRSF, 2013b). Recent research, however, has underscored the importance of approval and enforcement by national regulators as a key driver to the IFRS Standards becoming dominant in practice (Botzem & Dobusch, 2012). This is an experience also shared by digital reporting (Locke et al., 2010; Troshani et al., 2015).

This type of sociological approach to standard-setting has made an important contribution to our understanding of standardisation. However, the analysis omits important perspectives on the complexity of standardisation by paying insufficient attention to the standards themselves as fabricated technological objects, which are often nested or derived from other standards (Hanseth et al., 2006; Lampland & Star, 2009; Latour, 1991, 1992).

In the next section we introduce a conceptual approach to incorporating the standards into the analysis of the standardisation process.

3.2 Actor network theory: circulating reference and translation

ANT is used to analyse the transformation of IFRS Standards into the IFRS Taxonomy. The Taxonomy is conceptualised as an (un)contested black-box representation of the IFRS Standards (Latour, 1996). We therefore focus on formation, "*before* the box closes and becomes black" (Latour, 1987, p. 21, emphasis in original), to understand emerging tensions and ensuing consequences (Lowe, 2001a, 2001b).

We mobilise two key ANT concepts, namely, circulating reference and translation. A circulating reference results from a series of incremental transformations between a real world phenomenon (the referent) and the form in which it is presented (the reference) (Latour, 1999b). These transformations form a chain in which references are produced.

A reference presents the phenomenon to make it known to others or to substitute it in subsequent transformations. It can be presented as text, diagrams, visualisations, and calculations that constitute the culmination of transformation processes. With each transformation in the chain, a reference is described as circulating when the gap between referent and reference is traceable both backwards and forwards. A key requirement of a

[6] The IFRS Foundation (and its standard-setting committee, the IASB) succeeded the International Accounting Standards Committee (IASC) in 2001. The IASC was founded in 1973 (Zeff, 2012).

circulating reference chain is that it remains reversible (Latour, 1999b). Otherwise, it is "interrupted … [it] ceases to transport truth [the truth value of referent]" (Latour, 1999b, p.69).

Another way to conceptualise a reference in ANT is as a medium that incorporates the interests of various actors (Latour, 1987). Indeed, "by virtue of the particulars of its design, [a reference] invariably reflects the interests of some actors and not of others" (Ramiller, 2007, p. 198).

A reference can become unchallenged in a network through translation, the process of convincing actors to become allies and to act in accordance with defined roles in collective action that aims to form a reference that is a legitimate, undisputable representation of the referent (Callon, 1986a, 1986b). A key feature of translation is the obligatory passage point (OPP): the condition(s) that define negotiation spaces and mediate interaction among actors to facilitate the inclusive formation of a reference (Callon, 1986a, 1986b).

Translation cultivates network stability by aligning or silencing diverging interests of actors. There is always potential for dissonance in the network and trials of strength with those actors who believe that a reference does not reflect or serve their interests as they expect. These actors can threaten network stability with deviant engagement or resistance to translation. A reference may thus be contested by dissenting actors at any time (Callon, 1986b). Unless sufficient actors are translated, the chain of transformations is interrupted and the reference will lose its ability to circulate. A reference that is not circulating is not diffusing the inscription it carries. As argued by Mennicken (2008):

> …the notion of translation helps emphasise the constructed nature of the … standards and points to the various persuasive strategies, power plays and relations underlying their diffusion (p. 386).

3.3 Formation and diffusion of standards: A translation model

In Latour's (1999b) circulating reference conceptualisation, the chain of transformations and actor translations originate from the referent, a specific real world phenomenon. In these transformations, some aspects of the referent are lost while others are gained as references become generalised forms that re-present the referent. What is lost includes local, material and particular aspects of the referent. Simultaneously, what is gained includes greater compatibility, standardisation and relative universality of the referent knowledge or truth in emerging references (Latour, 1999b).

In this study, we incorporate the process view of transnational standard formation of Botzem & Dobusch (2012) into Latour's (1999b) circulating reference conceptualisation. Specifically, Botzem & Dobusch (2012) provide complementary concepts that they identify as important in a reflexive cycle of legitimate standard formation. They identify the IFRS Foundation as having an inclusive approach which involves negotiation, argumentation and the synthesizing of alternatives. As a consensus emerges (as actors are translated), input legitimacy is established. This is not sufficient for diffusion, however, as the compromises made in reaching a consensus do not allow the standards to achieve output legitimacy until they are refocused to meet users' needs. The recognition of the output of the standardisation process as legitimate is argued by Botzem & Dobusch (2012) to be necessary to achieve diffusion (where the output can 'circulate').

The concepts of input and output legitimacy developed by Botzem & Dobusch (2012) provide a relevant process focus on standard formation that adds depth and richness to the framing of taxonomy development as a circulating reference. Latour (1999b) emphasises the materiality and agency of the standard as a reference while the process focus highlights the social role of input and output legitimacy in the diffusion of standards.

Based on Latour (1999b), Figure 1 shows the combined model with input and output legitimacy (abbreviated as I/O) deployed to explain the gap between the referent and its reference (Botzem & Dobusch, 2012). Factors which improve the input and output legitimacy of the reference, including the role of nested technologies that are translated into the network, enable the reference to circulate by closing the gap between the referent and reference. Factors that reduce the gap are '*connectors*' and those that undermine the actors' and actants' translation into the network are '*interrupters*'.

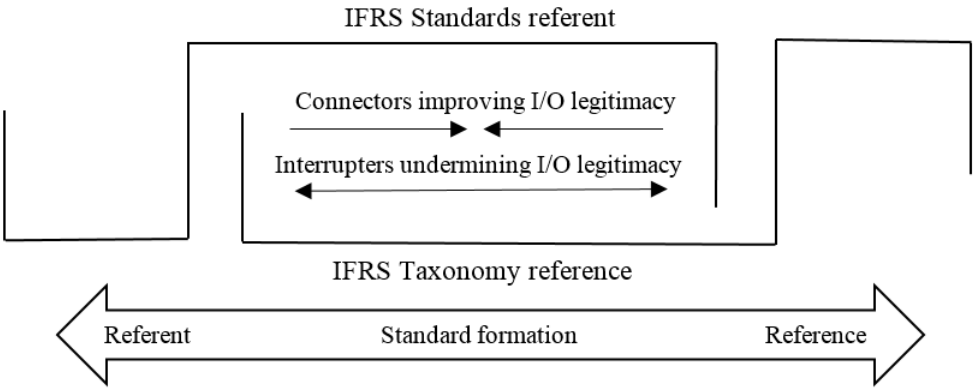

FIGURE 1. Circulating reference as a standardisation process

We conceptualise the IFRS Taxonomy as a reference and the IFRS Standards as the referent. The taxonomy re-presents the generic disclosure requirements of IFRS Standards in a digital form. The IFRS Taxonomy can be adopted or adapted (via extensions) by preparers to enable them to report in a digital form in accordance with IFRS Standards. By using the IFRS Taxonomy, preparers can contextualise the generic disclosure requirements of IFRS Standards to describe their performance and position in digital corporate reports.

We focus on the inclusive standardisation process through which IFRS Standards are transformed into their digital representation, the IFRS Taxonomy (Botzem & Dobusch, 2012). In this context, an inclusive process is particularly relevant but also prone to tension given the deep-rooted differences between accounting objects (e.g., principles-based accounting standards) and technology objects (e.g., prescriptive computer-readable taxonomies).

The IFRS Taxonomy can be conceptualised as an actor that materialises as an effect of relations in the 'IFRS network'. We define the IFRS network as those actors that produce the IFRS Taxonomy, can affect its shape and be influenced by it. It is comprised of the IFRS Foundation and IASB who together play a key role in attempts to translate those actors that support IFRS Standards to also support the IFRS Taxonomy as a facilitator of digital IFRS-based reporting. The network also includes the IFRS Taxonomy and 'technical' standard-

setting staff based within the IFRS Foundation. The IFRS Standards are an accounting object and the IFRS Taxonomy is a technology object in the IFRS network. The IFRS Taxonomy Consultative Group (ITCG), a group of international industry experts, regulators, and preparers of financial reports who review the IFRS Taxonomy, also contributes to the network. As the present design of the IFRS Taxonomy is based on XBRL technology, XBRL is also part of the IFRS network.

We trace how the IFRS Taxonomy is being formed in attempts to become a circulating reference of IFRS Standards and be legitimised in an inclusive process of standardisation. For this outcome to be achieved, key actors in the IFRS network must see the IFRS Taxonomy as a faithful representation of IFRS Standards: they must be effectively translated to support the IFRS Taxonomy.

In this process, we anticipate that pressures operate that either facilitate (connect) or obstruct (interrupt) translation activity and the traceability between IFRS Standards and the IFRS Taxonomy (Figure 1) (Botzem & Dobusch, 2012; Latour, 1999b). These pressures jointly shape why and how the IFRS Taxonomy materialises and preserves (or not) key translations, and in the process, becomes a circulating reference that is recognised by key actors in the IFRS network (Botzem & Dobusch, 2012; Latour, 1999b).

Latour's circulating reference concept is particularly useful in our setting because of it emphasises how actors recognise a reference as a legitimate representation of the referent and focuses on what is gained and what is lost in each transformation in the chain from referent to reference. A circulating reference therefore provides a unique perspective of standard representation as a temporary assemblage of actor interests and influences (Latour, 1999b). As a derivative standard, the IFRS Taxonomy assemblage includes IFRS Standards and other technology objects that ANT encourages researchers to trace. The model of standards formation in Figure 1 is applied in this research to analyse how the IFRS Taxonomy is derived from the IFRS Standards and how, through this process, the IFRS Taxonomy represents and enables certain actors but excludes others. The perspective helps illuminate implications and challenges that emerge as the IFRS Taxonomy circulates through actor networks to become a digital derivative standard and the conditions under which it might be used by actors for undertaking digital IFRS-based reporting.

4. Data collection and analysis

We adopted ANT as a basic interpretative framework for data collection and analysis. From this perspective, the manner in which the IFRS Taxonomy is formed is understood by examining the interpretations of actors as they interact and get tied in bonds of reciprocity in the IFRS Taxonomy construction process (Latour, 1999a).

We followed the actors to better understand their interactions and negotiations (Callon, 1986a). We approached the IFRS Foundation and used snowballing to identify relevant actors as data sources. Actors provided referrals to others who suggested yet others until actor networks and their boundaries were roughly set though never completely identified (Lowe, 2001a). To decide which actors to include we focused our investigative work on the assemblage of actors involved in constructing the IFRS Taxonomy (Lowe, 2001a). We included actors that affected the construction of the IFRS Taxonomy or that were affected by it including relevant technology objects.

Actors' interpretations concerning IFRS Taxonomy construction were captured empirically with qualitative data. Data were collected by interviewing human actors, observation, and reviewing supporting documentation including relevant publications and other materials located at websites including audio/visual recording of meetings at the IFRS Foundation. Thirty-one[7] actors were interviewed for an average of one hour between 2012–15, a timeframe that is characterised by intensive and significant IFRS Taxonomy construction work. The interviewees held key roles in organisations participating in the construction of the IFRS Taxonomy including: managers and heads of accounting, auditing, data assurance and ICT departments within data aggregators, accounting firms and standard-setters; directors of professional bodies; software developers and chief executive officers of software development organisations; and strategy and policy managers in regulatory agencies.

A one-page document summarising the study objectives and the open-ended, semi-structured questions was provided to informants prior to interviews. The questions sought to understand the roles and motivations of different actors, and strategies and mechanisms for engendering interest, enrolling and mobilising them in a stable IFRS Taxonomy network. To honour promised interviewee confidentiality[8] only the categories of actors have been identified and interviewee identifiers are based on broad categories (Table 2).

TABLE 2. Interviewees

Actor category	**Interviewee identifier**
IFRS Foundation - IASB - IFRS Taxonomy team - IFRS standard-setting team	IFRSF#1–15
ITCG	ITCG#1–5
IFRS Taxonomy Users - National standard-setter - National regulator - Preparers (filers)/accounting firms - Professional body - Data aggregator/investor relations - Software consultant	USER#1–11
Total	31

Interview evidence was supplemented by observation. Two researchers observed *in situ* the proceedings of the IFRS Taxonomy Annual Convention in April 2012 (IFRSF, 2012a) and the ITCG Meeting in April 2015 (IFRSF, 2015b). Other ITCG meetings were also observed by examining the audio/visual recordings at the IFRS Foundation website. Additional observation evidence was sourced by one of the researchers as a member of the IFRS Foundation's XBRL Advisory Council (XAC) between 2008–13[9].

IFRS Taxonomy documentation comprised of online audio/visual recordings of discussion papers, records of minutes of meetings, position papers and presentation

[7] Interviewee IFRSF#11 was interviewed twice. A total of 32 interviews were conducted.
[8] Ethics clearance was secured prior to commencement of data collection from the Ethics Committee at the University where one of the researchers was affiliated.
[9] The key objective of XAC is to provide strategic advice concerning XBRL in relation to development and adoption of taxonomies for IFRS (XAC, 2009).

slides/notes. ANT was found to be particularly useful in helping direct analysis towards understanding the unfolding action. This included identifying and distinguishing the categories of actors and their interests, and crucial developments concerning IFRS Taxonomy construction as it occurred.

5. Shaping the IFRS Taxonomy

While early IFRS Taxonomy construction efforts at the IFRS Foundation can be traced back to the year 2000, key changes and developments took place between 2012–13. We analyse how the IFRS Taxonomy was shaped as a result of relations with key actors in the IFRS network, including XBRL, the technology that underpins the IFRS Taxonomy. We find that the IFRS Taxonomy was subjected to pressures from IFRS, IFRS Foundation and XBRL. IFRS Foundation pressures operated as obligatory passage point conditions which attempted to define the IFRS Taxonomy while XBRL pressures attempted to dictate the taxonomy architecture and the language to be used to represent the IFRS Standards as a taxonomy. The discussion shows how early motivations of key actors inform their justification and explanation of the relevance of the IFRS Taxonomy.

5.1 How relevance and nature of IFRS Taxonomy was defined

Current dominant practice of providing IFRS-based corporate reports on websites (e.g., in PDF) was problematised by enforcement agencies (e.g., regulators, stock exchanges) and independent filing repositories (e.g., data aggregators) because it created data access inefficiencies resulting in high information search and processing costs (IFRSF, 2016b).

> A PDF is digital, [but] it's not interactive. And that was clearly a strong opinion to use something digital and to be able to navigate within. (IFRSF#3)

With a growing trend towards using technology for making IFRS-based accounting information available, demand emerged from enforcement agencies for a digital standard that could facilitate electronic transmission and sharing of IFRS-based information across different markets and computer platforms (IFRSF, 2016e). Some regulators and stock exchanges around the world (e.g., Netherlands, Japan, South Korea) had undertaken initiatives to develop electronic repositories of accounting data which required filers to tag data in corporate reports (IFRSF, 2016b). Meanwhile data aggregators and large institutional analysts (e.g., investment banks) were also collecting and structuring corporate reporting data according to their own proprietary taxonomies.

As these actors increasingly sought to collect electronic filings, there was a demand for the IFRS Foundation to establish an authoritative taxonomy and avoid having a plethora of proprietary taxonomies.

> There was a call from various parties to have a common taxonomy based on IFRS, otherwise we end up with each of the local jurisdictional regulators developing their own taxonomy. The whole benefit of electronic reporting is to have some consistency and the ability to read across jurisdictions so there was a call pretty early on to do that. (IFRSF#2)

To support regulators and preparers in these endeavours, the IFRS Foundation undertook to construct the IFRS Taxonomy. This was consistent with the IFRS Foundation's key aim of developing and promoting globally consistent IFRS Standards to firms and securing the dominance of IFRS Standards against potential future digital competitors.

By structuring content, the IFRS Taxonomy was envisaged to provide the means to facilitate the digital reporting of IFRS financial statements and to become a solution for addressing existing data access inefficiencies (Teixeira, 2013a). The IFRS Taxonomy had to be capable of achieving these outcomes to become a relevant actor in the IFRS network. This meant that the IFRS Taxonomy had to be an "accurate representation of the International Financial Reporting Standards" (IFRSF, 2016i).

An obligatory passage point was established by the IFRS Foundation comprising three conditions, which were meant to broadly define the nature of the IFRS Taxonomy and to lock it into the IFRS network. They were that the IFRS Taxonomy had to be faithful to the IFRS Standards' i) objectives, ii) principles-based nature, and iii) structure and content. These conditions were an attempt to ensure that the manner in which the IFRS Taxonomy could act in the network was predictable and consistent with IFRS Standards.

In relation to the first condition, the key objectives of the IFRS are to bring transparency, accountability and efficiency to financial markets internationally (IFRSF, 2016a). The IFRS Foundation aligned the objectives of the IFRS Taxonomy with those of the IFRS Standards specifying that it:

- "*Assists transparency*: increases accessibility of information for all market participants.
- *Assists accountability*: structured electronic data supports market enforcement of IFRS by regulators.
- *Assists efficiency*: accessible data may reduce costs to process IFRS information allowing users to focus on analysis." (IFRSF, 2016i, emphasis added)

The second condition imposed by the IFRS Foundation was to ensure that the principles-based nature of IFRS was maintained in the IFRS Taxonomy (IFRSF, 2013a). A key role assigned to the IASB was to systematically review the IFRS Taxonomy to "provide assurance that the IFRS Taxonomy content does not conflict with or interpret IFRSs and that electronic reporting considerations are duly reflected" (Hoogervorst, 2014, p. 6).

> In spite of the large number of pages in IFRS, it's still quite principles-based … there's freedom for people to tell their story… so you can organise your income statement, balance sheet in different ways according to your business. … companies should be applying the standards [in IFRS Taxonomy] to tell their story in the way they want to communicate with the investors. (IFRSF#2)

The third condition required the Taxonomy to be faithful to the structure and content of IFRS Standards. This meant that IFRS concepts were to be translated into the Taxonomy using a 'standards-based approach', replicating disclosure requirements of specific IFRS Standards (IFRSF, 2014b). The aim was to ensure that only the content, structure and hierarchy of the IFRS Standards would be modelled in the IFRS Taxonomy, potentially enhancing both its readability and usability.

> [I]f you look at a list of the items in our [IFRS] taxonomy you get our [IFRS] standard hierarchy. (IFRSF#7)

> … since the IFRS Taxonomy is based on IFRS standards … then there's no room for discussion of what the content of the tag really is. (USER#6)

To facilitate the 'standards-based approach' and the process of reviewing the consistency of structure and content between the IFRS Standards and IFRS Taxonomy, their development and release dates were aligned.

> Every time that … a new [IFRS] standard is being released or amended, the tags, the digital elements [in the IFRS Taxonomy] are part of the release. (IFRS#3)

5.2 Why XBRL-based representation was adopted for IFRS Taxonomy

The IFRS Taxonomy uses XBRL because it was perceived to be the only suitable free industry data standard for taxonomy construction that could help address the digital reporting ambitions of the IFRS Foundation (IFRSF, 2015b; Servais, 2010; Teixeira, 2013a).

> Is there an alternative to XBRL? …To my mind, there is only one [data standard] taxonomy that is common … that isn't proprietary, which is XBRL. I'm not aware of an alternative to XBRL at present. (IFRSF#2)

XBRL was perceived to provide the technical capability to transform the IFRS Standards from textual prescriptions into a codified taxonomy form (Table 1 (a)) that can be read and understood by computer systems in settings where digital reporting is expected (Ramin & Reiman, 2013). With an XBRL-based Taxonomy, actors such as companies, regulators, analysts and investors would be able to produce and receive digital IFRS-based corporate reports and extract, analyse and exchange specific data therein without manual intervention (Servais, 2010). Having the IFRS Taxonomy in XBRL format was therefore expected to enhance the usability of IFRS Standards (Ramin & Reiman, 2013).

> They [IFRS Foundation] looked at XBRL and realised … where the world was going with electronic reporting. They embraced XBRL. (IFRSF#11)

> The [XBRL] promise was solid enough … the promise of digital financial reporting… And that was a very simple promise probably which was appealing to the decision makers. (IFRSF#12)

XBRL was also useful in implementing the IFRS Taxonomy because of its extensibility, which means that individual filers could interpret IFRS Standards and adapt the IFRS Taxonomy by adding concepts as needed. An XBRL-based taxonomy allowed the presentation of digital reports featuring local, company-specific information whilst also adhering to IFRS compatibility and standardisation requirements. Extensibility was therefore seen as a means of offering flexibility to companies to suit their particular reporting needs consistent with the principles-based nature of IFRS Standards (Ramin & Reiman, 2013).

> Companies should be able to tell their story without being boxed into little squares. So companies … do need to be able to do their [own] extensions. (USER#3)

Taken together, these XBRL affordances were attractive to key actors in the IFRS network, and particularly to enforcement agencies (Servais, 2013a, 2013b).

Without an underlying technology to implement it, the IFRS Taxonomy would remain a theoretical solution to corporate reporting problems. Codifying the Taxonomy with XBRL was presented as the way to enable the solution to become operational in digital reporting practice. While solving some issues, the addition of XBRL also created some tensions and so the assemblage was not initially stable.

6. Tension and disconnect in IFRS Taxonomy construction

The IFRS network attempted a faithful transformation of IFRS Standards into the IFRS Taxonomy. For it to be a circulating reference, the IFRS Taxonomy would need to become a stable and durable reference translating key allies in the IFRS network into the IFRS Taxonomy. However, this transformation was characterised by tension and disconnect as a result of the incompatible natures of the IFRS and IFRS Taxonomy:

> [There is] tension between the principles-based approach to disclosure followed by the IASB and the more prescriptive requirements of a computer-based tagging system. (Teixeira, 2013a, p. 1)

This tension emerged as a result of the conflicting pressures between the obligatory passage point condition that the IFRS Taxonomy had to be faithful to the principles-based nature of the IFRS, and the pressure from XBRL to include additional definitions and tags so that the taxonomy provides sufficient tags to achieve the standardisation and comparability objectives of the IFRS Foundation (Botzem & Quack, 2009; IFRSF, 2016g).

> Each of them [IFRS disclosures] should be defined [in IFRS Taxonomy] so that we actually give structure to the electronic reporting and we avoid a situation of when one person says 'okay the taxonomy as it stands doesn't deal with my position because it doesn't include [say] short-term debt. So I'll create an extension and I'll call it, non-cash movements in short-term debt'. And then somebody else comes up with a different extension and names it differently, and you end up essentially with two things which are very similar, but defined differently, and it's all a mess. *The taxonomy has to be more comprehensive or complete, with tighter definitions of line items so that [one] can be confident as to exactly what [one] is getting*. (IFRSF#2, emphasis added)

However, providing additional detail for disclosures in the IFRS Taxonomy was resisted by the IFRS Foundation and IASB because the taxonomy team would be defining tags not included in the standards. This was undesirable since it compromised the principles-based OPP condition posed on the IFRS Taxonomy.

> The [IASB] Board was pretty much uncomfortable with the [IFRS Taxonomy] definitions because they felt, … how are we making sure that we are not interpreting the IFRS? (IFRSF#6)

This tension could undermine the traceability of the IFRS Taxonomy back to the IFRS Standards, and have the potential to create a disconnect between the IFRS Taxonomy on the one hand, and the IFRS Standards, IFRS Foundation and IASB, on the other.

Furthermore, a state of disengagement existed between the IFRS Taxonomy and preparers in the IFRS network. To effectively engage with the IFRS Taxonomy, preparers and regulators needed to have a general understanding of the manner in which it would eventually address the digital reporting problematisation. However, early translation rhetoric was often characterised by terminology concerning technical aspects of the IFRS Taxonomy that are defined by XBRL (e.g., taxonomy architecture and structural design). This rhetoric was unintelligible to non-IT professionals, and it created confusion among preparers and the perception that an XBRL-based IFRS Taxonomy was technical and complex.

> XBRL is about accounting and it's about IT, but accountants don't speak IT and IT doesn't speak accounting. And it's very difficult for those two communities to talk to each other, to understand each other. (IFRSF#5)

> It scares the hell out of me that we have allowed a bunch of technology guys to sit in the room and say, "My way of doing things is better than yours," and allowed this to go on for years, because it is doing nothing good for the marketplace. We need to actually make business decisions and not technical decisions. (USER#3)

> It's been sold as a technological fix, … rather than just [as] something that can be very helpful and enlightening and give you answers. (USER#8)

These perceptions became a key barrier and a reason why, at least initially, accountants with limited or no IT background became alienated from the IFRS Taxonomy and disengaged from translation activity.

> We get very few comments on proposed changes to the [IFRS] taxonomy which I think is a shame and we need to have more. … My understanding is that the people that comment on the taxonomy … have more of technical XBRL background rather than the sort of people that comment on the accounting standards. (IFRSF#2)

Overall, both tension and disconnection created challenges for the effective translation of actors in the IFRS network. Meanwhile, as digital reporting of financial information was becoming increasingly important, a strategic review was undertaken in 2011 at the IFRS Foundation to assess roles of the IFRS Taxonomy and XBRL (IFRSF, 2012b). It culminated with recommendations which were implemented in 2012–13 (Teixeira, 2013a, 2013b).

The review was aimed at assessing what value taxonomy construction could add to IFRS standard-setting and to identify strategies for diffusing tension and addressing the disconnect. The following sections describe the devices and activities that emerged as a result of the review.

6.1 Technology-neutrality: Loosening the knot between the IFRS Taxonomy and XBRL

To enhance translation of actors in the IFRS network, IFRS Taxonomy construction was re-cast by the IASB to be technology-neutral. This meant separating the classification of IFRS principles in the Taxonomy from the technology used to manage it, currently XBRL.

> At its simplest level, a taxonomy is a classification system. The IFRS Taxonomy is a way of classifying IFRS requirements. The technology that works behind the taxonomy is important, but it is not essential for IASB members, preparers or users to understand XBRL to be able to oversee or work with the IFRS Taxonomy. (Teixeira, 2013a, p. 10)

> [A]s a broader organisation, we probably have to think more strategically about technology, but it is not just XBRL-related. I think, it's to do with the way we set standards. (IFRSF#15)

Although XBRL was considered to be an industry standard for both taxonomy construction and digital reporting at the time of data collection, it was depicted as just a "delivery mechanism" (IFRSF#2), "a technology solution for delivering content [financial data]" (USER#5).

The IFRS Foundation and IASB took the position that the principles underlying the IFRS classification in the IFRS Taxonomy were likely to remain relevant irrespective of developments in technology. De-coupling of IFRS classification from specific technology became essential to future-proof the taxonomy.

> Separating the classification principles from the technology used to manage the taxonomy is critical. The conceptual underpinnings of our taxonomy development and the evolution

> towards electronic reporting are likely to be more enduring than the technology used to manage the taxonomy. (Teixeira, 2013a, p. 8)

The IASB reduced the reliance of the IFRS Taxonomy on XBRL by dissociating the IFRS classification from XBRL.

> We plan to separate development of the IFRS Taxonomy from XBRL-specific matters. … The technology behind the taxonomy, i.e., XBRL, will be de-emphasised. (Teixeira, 2013b, p. 2)

Technology-neutrality meant that translation activity targeting actors in the IFRS network could take advantage of a view of the IFRS Taxonomy featuring a human-readable representation of the IFRS (e.g., via a web-browser). Translation activity and rhetoric could be steered away from the specific technology, knowledge of which is inconsequential and off-putting to key users. This inclusion strategy was widely seen as a way of appealing more broadly to IFRS network actors.

> Much of the documentation we have that accompanies the IFRS Taxonomy is written in a style, and uses language, more familiar to programmers and systems people than to a general reader. There is also a particular emphasis on the technology behind the taxonomy—i.e., XBRL. It is important that we begin to demystify the process of developing an IFRS Taxonomy. (Teixeira, 2013a, pp. 9-10)

Additionally, with the prospect of new technologies emerging, possibly competing with XBRL, a technology-neutral IFRS Taxonomy would be resilient if XBRL became obsolete. The relationship between the IFRS Taxonomy and XBRL could be quickly interrupted, and new relationships created with competing technology with little or no impact on the IFRS Taxonomy itself.

> A semantic layer [IFRS Taxonomy] should itself be technology-neutral, enabling the porting of taxonomy information between technologies. (IFRSF, 2015a, p. 4)

> The [IFRS] taxonomy … should be useful outside and above specific technology ….So [we are] … trying to abstract it away from where it is currently rooted in XBRL, so it can be used in other formats, so it can be used in its own right. (IFRSF#7)

This repositioning of XBRL as an important yet disposable ally of the IFRS Taxonomy reflects the power of IFRS as accepted international GAAP. There are mutual benefits for XBRL and IFRS Standards in their IFRS Taxonomy-mediated relationship, but without a significant disruptor to how accounting is conceptualised, the IFRS Standards have a greater expectation of longevity than the XBRL data standard. Nonetheless, as we discuss later, the IFRS network also has a limited ability to affect change in XBRL, leaving the IFRS Taxonomy somewhat vulnerable in the absence of a readily adoptable replacement.

6.2 Mobilising key alliances for constructing IFRS Taxonomy

In its early days, IFRS Taxonomy construction at the IFRS Foundation had a dominant XBRL technology focus, and the team in charge of this task was officially known as the ‘XBRL team’. Although the XBRL team was meant to support IASB standard-setting activity, structurally, it was located outside the IASB, as part of the IFRS Foundation. Having the XBRL team outside the IASB, meant that IFRS Taxonomy construction was not integrated into IFRS standard-setting.

> It [IFRS Taxonomy construction] wasn't an IASB activity. It was an IFRS Foundation activity. By running it from that Foundation, they can perform things that complement or supplement the standard-setting, but it was never part of the IASB or the standard-setting bodies. They were very clear on that. (IFRSF#11)

Yet, many actors in the IFRS network believe that taxonomy construction adds value to standard-setting (Hoogervorst, 2012). Some actors perceived that IFRS Taxonomy construction can improve IFRS standard-setting in terms of disclosure clarity, structure, modelling, and identification of gaps, inconsistencies and contradictions.

> Where taxonomy can influence and help and assist [IFRS standard-setting] is first of all to make sure that you have used very clear and concise language; that you have structured your text [in IFRS standards] in such a way that it is easy and understandable; that you have identified areas where there may be a conflict with descriptions in other [IFRS] standards. (IFRSF#11)

The IFRS Foundation's 2011 strategic review prompted structural changes that aimed to strengthen the value-adding role of taxonomy construction to standard-setting. The internal reconfiguration which integrated the XBRL team with the specific IFRS standard-setting 'technical' staff was undertaken in 2012–13. The XBRL team was re-named as the IFRS Taxonomy team, and its role was re-oriented to focus on taxonomy construction and the completeness, consistency and clarity of the accounting concepts, while retaining XBRL expertise (Hoogervorst, 2014).

> XBRL is no longer an afterthought to our standard-setting activities–something to consider as the final standard is about to be published. Our technical [standard-setting] staff now work with their XBRL colleagues throughout the entire lifecycle of the project, considering tagging implications as the standards are being drafted. … XBRL should be a normal function of our standard-setting work. No more, and no less. (Hoogervorst, 2012, p. 3)

> The most fundamental change is one of focus and orientation. … To implement this change it is important that the current XBRL team staff are further assimilated into the technical [IFRS standard-setting] team. (Teixeira, 2013b, p. 2)

Both standard-setting and IFRS Taxonomy construction processes were also changed (Teixeira, 2013b). IFRS Taxonomy construction became integrated with IFRS development while the IASB undertook the formal responsibility of reviewing and approving IFRS Taxonomy releases (Knubley, 2016; Shields, 2014).

> We've [standard-setting team] also brought in the IFRS Taxonomy Team, in effect to try and get closer interaction between standard-setting and development of the technology. We have monthly meetings together… there's been a lot more interaction, between the two teams on just a day-to-day basis. So we will be doing some work about reviewing existing standards and so one of my team members will go and talk to one of the taxonomy guys because they've got such a good view of the disclosure requirements, perhaps a better overview than anybody in the organisation. (IFRSF#15)

The structural and process changes for the IFRS Taxonomy team were an attempt to translate the taxonomy into the IFRS network. The roles of both teams were re-defined in the alliance. They had to work jointly and consult each other as IFRS Standards and the IFRS Taxonomy were constructed.

> [T]there is a formal requirement for the technical [standard-setting] team to tick the box that they have consulted with the IFRS taxonomy team. (IFRSF#6)

> [W]hile XBRL considerations should not dictate the substance of the standard-setting process, the Trustees recognise the growing importance of XBRL requirements… Consequently, in drafting new standards, the IASB should take into account the need for language that is easily translatable into… a consistent [IFRS] XBRL taxonomy. (IFRSF, 2012b, p. 7)

However, the requirement to fulfil the OPP conditions set for the IFRS Taxonomy remained:

> We [IFRS Taxonomy team] are not in the position to decide what to take out from the taxonomy. (IFRSF#8)

> [IFRS Taxonomy construction should be characterised by]… greater involvement of the IASB with the IFRS Taxonomy content, while recognising that the IFRS Taxonomy may aid, but does not dictate, standard-setting activities. (IFRSF, 2015a, p. 3).

Both structural and process changes strengthened the dynamics of interaction between the IFRS Taxonomy and standard-setting teams.

> I think that [structural change] kind of triggered the whole process … we [IFRS Taxonomy team] are involved [in standard-setting] earlier and earlier. … They [standard-setting team] actually discuss the content of the standards [with IFRS Taxonomy team]. We are part of the disclosure machine. (IFRSF#6)

These interactions also strengthened the perceptions about the value-adding "quality assurance" (IFRSF, 2012b, p. 20) role of the IFRS Taxonomy team within the IFRS Foundation in relation to the standard-setting process.

> ...[initially] within the organisation [IFRS Foundation] the perception was that the taxonomy team is an IT team. Now they [standard-setting team] are more and more responsive to the comments that we [IFRS Taxonomy team] give them. I think they more and more see the benefits. (IFRSF#6)

> Oh yeah! … [IFRS Taxonomy team member] is really good … [s/he] came at it from an IT processing point of view and I [standard-setting team member] came at it from a standard-setting point of view. So between us that did definitely add value to the document [IFRS Standards]. The fact that you have to put it through the taxonomy team who are quite rigid in the way it's got to be formulated, *it's like a quality check. It might take more time but it definitely is a rigorous quality check*. (IFRSF#13, emphasis added)

6.3 How inclusiveness was attempted with interessement devices

'Due process' is a device widely used by the IFRS Foundation to legitimise their standard-setting processes and provide a means for actors to be consulted (Ogun-Clijmans & Wood, 2015b). The due process governing the Taxonomy closely resembled the due process used in constructing accounting standards (IFRSF, 2013b), thereby strengthening the alliance between the IFRS Taxonomy and IFRS Standards. The process governs how elements are added, updated, or removed from the IFRS Taxonomy to incorporate changes made in IFRS Standards (IFRSF, 2015c). Whilst used to incorporate the interests of actors in the IFRS network, the due process was designed to ensure that content of the IFRS Taxonomy is strictly aligned with the underlying IFRS Standards (IFRSF, 2010).

Due process included a review by the IFRS Taxonomy Review Panel, a panel comprised of three to five IASB members who oversee the IFRS Taxonomy to ensure that changes or updates reflect IFRS content. Similarly, the IFRS Taxonomy Consultative Group (ITCG), an advisory and review forum comprised of 16–20 financial reporting and XBRL technology experts from key jurisdictions (e.g., US, UK, Germany, China, Japan), systematically reviews the technical integrity of the IFRS Taxonomy; particularly checking the consistency with IFRS Standards, XBRL specifications, and with the IFRS Foundation's digital reporting objectives (IFRSF, 2014a). To stabilise the alliance between IFRS Taxonomy and XBRL, the IFRS Foundation also maintains "an ongoing process of observing developing XBRL technology" (IFRSF, 2010, p. 9).

To achieve further interessement, the IFRS Taxonomy is also subjected to wider public consultation including all jurisdictions where IFRS Standards are used (IFRSF, 2016c). To inscribe interests of other actors, feedback from these reviews is considered for inclusion into IFRS Taxonomy revisions or responded to in public fora (IFRSF, 2015c). Fatal flaw reviews form the final part of due process before the IFRS Taxonomy is officially published (Ogun-Clijmans & Wood, 2015a). Due process therefore supports the perception that the IFRS Taxonomy is a faithful digital representation of the IFRS Standards.

Interessement devices are employed during due process to strengthen alliances between the IFRS Taxonomy, IFRS Standards and XBRL. For example, in a typical IFRS Taxonomy construction round, a spreadsheet is used to create a detailed mapping of IFRS Standards. This mapping encapsulates the logical representation of IFRS Standards and it is constructed jointly between IFRS Taxonomy and technical standard-setting teams. An XBRL conversion tool, the Taxonomy Management System, is subsequently used to convert content from the spreadsheet into the XBRL format.

6.4 Accessibility devices for engendering interest

The IFRS Foundation sought to support the inclusion of actors external to the organisation into IFRS Taxonomy formation by providing accessibility devices that help non-IT experts engage with the IFRS Taxonomy and which are consistent with a technology-neutral approach. They present the electronic human-readable view of the IFRS Taxonomy focussing on the logical representation of the IFRS Standards, while obscuring the machine-readable technical XBRL layer of the IFRS Taxonomy. By facilitating the understanding and use of the IFRS Taxonomy it was anticipated that the IFRS Taxonomy's faithful representation of IFRS Standards would become visible and persuade others to become allies. Key devices include the IFRS Taxonomy Illustrated and xIFRS which do not require XBRL knowledge (IFRSF, 2014c) (Table 3).

TABLE 3. Examples of accessibility devices for IFRS Taxonomy

Accessibility device	Description
IFRS Taxonomy Illustrated (ITI)	ITI is a simplified visual representation of the IFRS Taxonomy in PDF/HTML format. ITI presents both the hierarchy of the IFRS Taxonomy and the elements in it. Each element represents IFRS disclosure requirements. ITI also shows the required nature of the format of these elements (i.e., text, monetary, numeric) as well as other elements to which they relate.
xIFRS	xIFRS offers a view of the electronic Standards with embedded IFRS Taxonomy elements which supports viewing, understanding and use of the IFRS Taxonomy. No knowledge of the XBRL technical format is required.

7. How regulators and preparers have responded

The previous sections discuss attempts to diffuse the tensions that have emerged in the process of constructing the IFRS Taxonomy while also addressing the disconnection with important users including regulators and preparers. Translating these actors is important if the IFRS Taxonomy is to be perceived as a circulating reference of the IFRS for them.

> That's the sort of concept that if you bring them [users] in, in partnership, and they are part of the process of developing the [IFRS Taxonomy] standard. And they understand why the decisions have been made, then when it comes to actual adoption they will take it (IFRSF#13).

In this section we discuss some of their responses to the taxonomy project.

7.1 How regulators mobilised

Regulators are important IFRS Taxonomy adopters that have been mobilised in IFRS Taxonomy construction. These agencies include securities regulators, company registrars and stock exchanges, banking and insurance supervisors, and statistical and tax agencies (IFRSF, 2015b; Servais, 2013a). In June 2016, there were 14 securities regulators around the world (e.g., UK, Japan, South Korea) that were using the IFRS Taxonomy while major regulators such as ESMA mandated use of the IFRS Taxonomy in EU from 2020 and US SEC allowed its use in the US from March 2017 (ESMA, 2016; Ogun-Clijmans, 2016; USSEC, 2017).

Regulators that are using the IFRS Taxonomy or considering it are enrolled in the IFRS network. Some participate regularly in ITCG meetings and in due process concerning IFRS Taxonomy construction. Some regulators have adopted the IFRS Taxonomy "as issued" by the IFRS Foundation either allowing preparers in their jurisdictions to make extensions to it (e.g., Japan Financial Services Agency, Tokyo Stock Exchange) or not (IFRSF, 2012c; Ogun-Clijmans, 2016). Other agencies supplemented the IFRS Taxonomy with regulator-specific extensions before either allowing preparers to make company-specific extensions (e.g., European Banking Authority) or not (e.g., South Korea's DART System of Financial Supervisory Service) (IFRSF, 2012c). Evidently, mobilisation of these agencies exhibited different nuances, but was consistent with OPP conditions set by the IFRS Foundation for the IFRS Taxonomy.

7.2 Challenges for inclusion of preparers

Evidence suggests that there has been limited translation of preparers in relation to the IFRS Taxonomy. Few preparers (e.g., 'Big 4' and other large accounting firms) have responded to inclusion strategies and enrolled in the IFRS network (e.g., by participating in IFRS Taxonomy due process (IFRSF, 2012c).

> It's fair to say as well that we don't receive too much comment [from preparers], although we have a good [due] process. (IFRSF#10)

A possible explanation for limited preparer engagement is related to problematisation. The essence of existing problematisation as articulated by the IFRS Foundation favours the needs of regulators. It focuses on how traditional corporate reporting suffers from data access inefficiencies and high information search and processing costs from a regulators' viewpoint (IFRSF, 2016b). For example, in its official IFRS Standards and electronic reporting webpage, the IFRS Foundation stresses the needs of enforcement agencies, rather than those of the preparers:

> *Securities regulators and stock exchanges appreciate the importance of access to general purpose reports, which is why financial reports for listed entities are required to be filed, sometimes in a specific format.…* In recent years many [enforcement agencies] have also introduced requirements to tag data inside these reports to make smaller parts of the financial statement searchable and accessible, instead of simply having PDF versions on a website, to improve access to data and reduce search costs. (IFRSF, 2016b, emphasis added).

Furthermore, at the time of data collection IFRS Taxonomy use guides have been developed for regulators specifically, rather than preparers (IFRSF, 2015d, 2015e).

Consequently, many preparers have not recognised the IFRS Taxonomy as a solution to the existing corporate reporting problems as posed by the IFRS Foundation (IFRSF, 2016b). Our evidence suggests that many preparers, particularly smaller companies, do not understand how using the IFRS Taxonomy to tag their corporate reports could be beneficial.

> What is the [IFRS Taxonomy] benefit for the company [preparer]–hasn't yet been really established. … So as long as they don't have to, they will stay away from that [IFRS Taxonomy] because they don't see the benefit for them. (USER#9)

> I have to say, for companies, right now, I do think it is an added burden… because it is an extra step that you have to do in order to file financial statements… (USER#6)

The ineffective problematisation and interessement of preparers has been reflected in their low voluntary use of the IFRS Taxonomy. This has also had implications for software developers who interpret limited interest from preparers as a weak business case to develop software applications that facilitate use of the IFRS Taxonomy and digital reporting (IFRSF#14; IFRSF#7).

8. Concluding discussion

We examine the process of constructing the IFRS Taxonomy as a legitimate digital standard using the concepts of circulating reference and translation in the context of a model of transnational standard formation. We focus on what the IFRS network gains and what is given up as well as the implications for the taxonomy's adoption.

The circulating reference conceptualisation adds depth to a process model of standardisation by including the standard as an effect of actor relations in the network. These relations, often exemplified as interests and influences permitted in an inclusive approach to standard formation, have invented, shaped, and maintained the identity of the IFRS Taxonomy as a form that purports to represent the IFRS Standards. These relations have also effectively become the means by which the IFRS Taxonomy 'explains' its *raison d'être* and its position in the IFRS network as an actor with the ability to facilitate digital reporting of IFRS-based corporate reports. Whilst this is consistent with established views in prior standardisation research that a standard holds a standard-setting network together (Timmermans & Epstein, 2010), our analysis focuses on how a standard-setting network is extended to form derivative (nested) standards.

The IFRS Taxonomy gains and maintains power to act in the IFRS network by translating its actors (Latour, 1999b). It is argued here that if the IFRS Taxonomy is to become influential in the IFRS network it needs to be perceived as a circulating reference of IFRS Standards. This means that the IFRS Taxonomy must be seen as legitimate by the allies of IFRS Standards.

However, we find that attempts of the IFRS Taxonomy to make allies in the IFRS network have not been smooth. Some relations between the IFRS Taxonomy and other actors were conducive for ensuring that the 'truth value' of IFRS Standards remains intact in the IFRS Taxonomy while others were characterised by trials of strength that have obstructed traceability between IFRS Standards and the IFRS Taxonomy.

The relations that are conducive to the IFRS Taxonomy being a circulating reference we characterise as *connectors* that enhance input legitimacy. Those that obstruct traceability are *interrupters* that reduce output legitimacy, and ultimately the ability of the reference to circulate (Figure 2).

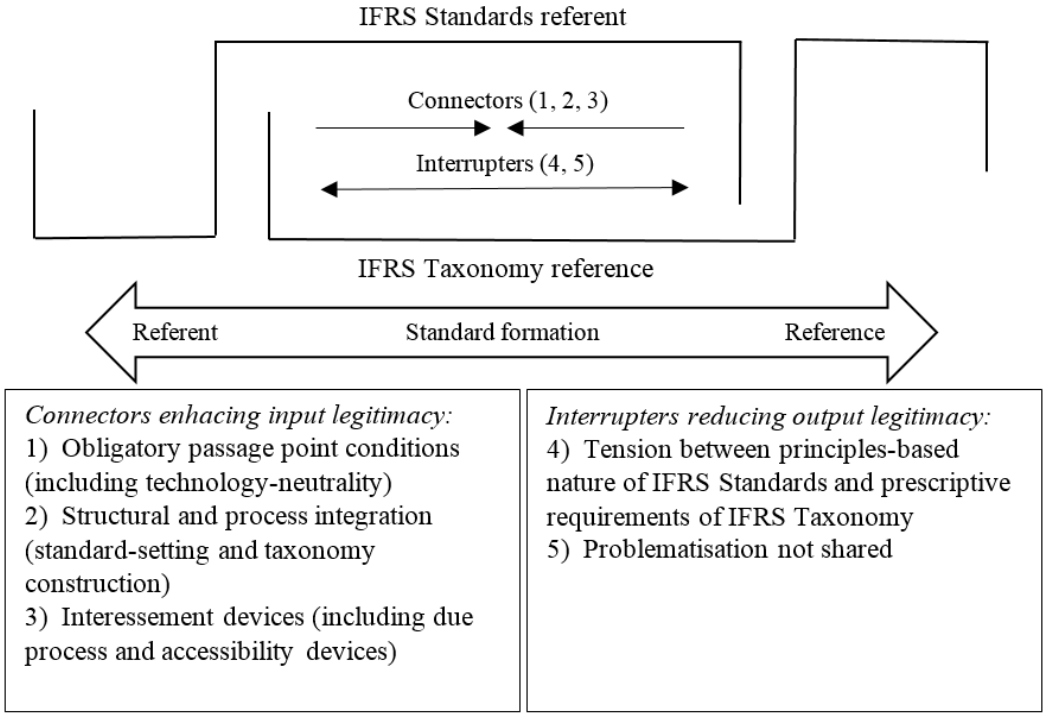

FIGURE 2. Forming IFRS Taxonomy as a digital derivative of IFRS Standards

Connectors and interrupters shape the ability of the IFRS Taxonomy to act and be relevant in the IFRS network. They affect whether actors in the IFRS network perceive that the IFRS Taxonomy faithfully represents IFRS Standards and facilitates digital corporate reporting.

Our evidence shows that the faithfulness conditions established as an obligatory passage point for the IFRS Taxonomy constitute a strong signal to IFRS allies of the intended representational faithfulness of the IFRS Taxonomy. By themselves, however, these conditions were not sufficient to produce translation and make the IFRS Taxonomy circulate, rather additional effort was needed.

The rhetoric was shifted to emphasise that the taxonomy would be technology-neutral. IFRS Taxonomy construction was redefined as consisting of two distinct layers. First, the technology-neutral, human-readable representation of IFRS Standards in the IFRS Taxonomy. Second, the technology-driven machine-readable representation of the IFRS Taxonomy that would enable it to work with computer applications. This redefinition helped strengthen the association between the IFRS Taxonomy and IFRS Standards. It was justified by rhetoric that the logical representation of the IFRS Standards would endure beyond the technology used to represent them. This shift weakened, though it did not cut, the association between the IFRS Taxonomy and XBRL.

Since XBRL was widely considered to be the best data standard at the time of data collection, the relation between IFRS Taxonomy and XBRL had to be strong enough to enable the IFRS Taxonomy to act but weak enough to be easily severed so that XBRL could be quickly replaced with superior technologies. This 'distancing' required a delicate balance between the technology independence gained and the potential loss of XBRL allies.

The IFRS Taxonomy is an assemblage of many technologies, but derives its strength from the IFRS Standards and XBRL. As predicted by Botzem & Dobusch (2012) an inclusive approach that translates the interests of allies of both technologies is most likely to lead to input and output legitimacy. The tensions created for accounting standard-setters seeking to maintain the dominance of the accounting perspective in the face of growing IT technical input and requirements hampered the development of a useful IFRS Taxonomy for many years.

This analysis also highlights the role of the standards themselves in creating conditions for legitimacy in the reflexive model of transnational standards creation (Botzem & Dobusch, 2012). In this case, the IFRS Taxonomy must be perceived as a standard that does not violate the existing IFRS network, but rather it extends it in ways that make IFRS corporate reporting possible in the digital space.

Some standardisation research has argued that a 'new' standard is not formed *de novo* but is nested in existing standards (Lampland & Star, 2009; Timmermans & Berg, 1997). It can be seen as a derivative standard and must be legitimised in the existing network of adopters. Our conceptualisation of the IFRS Taxonomy as a circulating reference extends the understanding of the process of standard formation by including stipulations (e.g., obligatory passage point conditions) under which a derivative standard may be perceived as legitimate.

The stipulations result in gains and losses to allies in the network and the derivative standard may ultimately need modification to ensure its viability.

The reorganisation of the IFRS Taxonomy team, bringing them into close physical and organisational proximity to those drafting the accounting standards, and the institutionalised integration between the previously loosely articulated processes strengthened the association between the two standards and teams. This organisational change promoted better understanding of the taxonomy team's potential contribution to standard-setting; particularly in clarifying concepts and resolving inconsistencies between IFRS Standards. It also improved communication about accounting issues to support improved taxonomy construction.

This structural reconfiguration had implications for the behaviour of actors at different levels within the IFRS Foundation and IASB. Attitudes of the teams and some Board members and Trustees towards the Taxonomy were affected by increased familiarity. The regular interactions and mutual influences impacted both the taxonomy and the accounting standards. Consequently, tension emerged in the network: in gaining improvements to the clarity of conceptual expression in the standards and taxonomy, some allies had to relinquish the absolute primacy of accounting standards. While this tension remained in the network at the time of data collection, efforts were made to reduce it by clarifying the value propositions and roles of the technical standard-setting and IFRS Taxonomy teams.

The IFRS Foundation has a long experience with due process in setting IFRS Standards. Due process has been used as a formal device for encouraging participation and engaging with actors in attempts to achieve legitimacy for IFRS Standards (Botzem & Quack, 2006, 2009). The IFRS Foundation leveraged this experience by incorporating very similar principles into a new form of due process to legitimise the construction and maintenance of the IFRS Taxonomy.

The 'IFRS Taxonomy due process' was a new interessement device that had the advantage of being a familiar and historically established engagement practice that sought to facilitate the engagement of actors in the IFRS network with the IFRS Taxonomy. This is consistent with Timmermans & Berg (1997) who discuss the reflexive relationship between standardisation procedures and the infrastructures in which they are embedded.

Accessibility devices were deployed by the IFRS Foundation to convince actors in the IFRS network that the IFRS Taxonomy was an extended form of IFRS Standards and that the essence of the Standards remains intact in the IFRS Taxonomy. These devices help close the perceived gap between the reference and referent because the IFRS Taxonomy is in a technical (XBRL) format unintelligible to most of the actors in the IFRS network.

The interessement and accessibility devices played an important role in pre-empting criticism that the IFRS Foundation has historically experienced about the transparency of IFRS standard-setting (Botzem & Hofmann, 2010; Botzem, 2012; Botzem & Dobusch, 2012). However, despite the efforts of the IFRS Foundation to simplify and communicate the benefits of the IFRS Taxonomy, our evidence shows that enrolment was predominantly restricted to securities regulators, rather than preparers and software developers.

Nevertheless, taken together, obligatory passage point conditions, structural integration and interessement devices played an important role in achieving some key translations which

contributed to an improved and traceable transformation from IFRS Standards into the IFRS Taxonomy. Our analysis also demonstrates that two key struggles remain and continue to obstruct the traceability, thereby endangering the legitimacy of the IFRS Taxonomy. The first is a product of essential differences in the nature of technological and accounting standards, and the second is the barrier to translation caused by the limited use of the IFRS Taxonomy by preparers.

The first struggle is related to the inherent incompatibility between the principles-based nature of IFRS Standards and the prescriptive detail-oriented nature of a computer-based taxonomy (Teixeira, 2013a). To secure and strengthen the alliance between IFRS Standards and IFRS Taxonomy, the 'connector' mechanisms were deployed to reduce tension and enhance inclusiveness and input legitimacy. However, the need to enhance taxonomy usability by including additional detail over and above that detailed in IFRS Standards challenges the "faithful to the principles-based nature of IFRS Standards" condition. While the IFRS Taxonomy is subject to regular review which attempts to enforce this condition, the usability problem is persuasive given the pressure to boost regulator and preparer adoption of the IFRS Taxonomy and to secure a dominant position for IFRS Standards in digital reporting. To make this gain in the network, the purity of the principles-based approach is compromised. Our evidence shows that this tension remained at the time of the data collection. An important implication is that this tension is likely to continue while the development of the IFRS Taxonomy remains in the formation stage (Botzem & Hofmann, 2010; Botzem & Dobusch, 2012).

The struggle to achieve broader inclusiveness is an issue for the common allies of the two objects, namely, the IFRS Foundation, the IASB, and IFRS standard-setting and IFRS Taxonomy teams. Regulators and preparers, are key IFRS allies, as evidenced by extensive IFRS adoption (IFRSF, 2015f). However, whilst a limited number of preparers and some key regulators have become allies of the IFRS Taxonomy, broader voluntary adoption of the IFRS Taxonomy remained elusive (Ogun-Clijmans, 2016).

In common with XBRL experience, preparers have not been translated as allies of IFRS Taxonomy apart from a limited number of 'champions' who have contributed to the IFRS Taxonomy project through membership in IFRS Foundation committees and participation in consultations with the IFRS Taxonomy team. The limited engagement of preparers with due process suggests ineffective translation of preparers in the IFRS network (Callon, 1986b). The lack of engagement may in part be due to ineffective problematisation of the IFRS Taxonomy to preparers and the cost of adopting XBRL as the underlying technology during a period characterised by growing XBRL disillusionment (Locke & Lowe, 2007; Troshani et al., 2015).

Endorsement and enforcement by public authorities are the key means by which privately negotiated standards such as the IFRS became dominant (Botzem & Hofmann, 2010; Botzem, 2012; Botzem & Dobusch, 2012). The recent decisions by the ESMA and the US SEC supporting IFRS Taxonomy use (ESMA, 2016; USSEC, 2017) are important to stimulate adoption of the IFRS Taxonomy. These regulatory moves confer legitimacy on the IFRS Taxonomy which can lead to a critical mass of mandatory adoption. Irrespective of whether preparers accept that digital reporting using the IFRS Taxonomy has benefits for them, a regulatory mandate produces a form of problematisation for preparers: they will face

sanctions for failing to use the taxonomy. Consequently, preparers are likely to become increasingly interested in inscribing their interests into the IFRS Taxonomy. This will be supported by the current rhetoric that reduces the emphasis on the technical and the provision of accessibility devices that simplify engagement with the taxonomy. Regulatory mandate is also effective in stimulating the production of applications to support digital IFRS reporting which are very limited in number and sophistication (Locke & Lowe, 2007). Software developers' limited engagement with IFRS-based digital reporting is directly linked with weak IFRS Taxonomy demand, but the problem is a 'catch 22' in which software developers will be motivated when there is a demand from customers. The regulatory mandate breaks this impasse by creating the demand.

While significant structural decisions have already been made for the formation of the IFRS Taxonomy, it is unclear at present what the nature of the preparers' influence is likely to be. We expect preparers to prefer an extensible IFRS Taxonomy, enabling them to 'tell their own story' in corporate reports. Regulators, by contrast, are likely to require a taxonomy that minimises the number of extensions that preparers need to make, thereby, making the taxonomy a "standardising tool" (USER#5). This pressure reinforces the struggle against the principles-based limitation on IFRS Taxonomy development. Consistent with existing IFRS standard-setting research, it is expected that the recursive cycles of formation and diffusion will further shape both how this struggle, and the IFRS Taxonomy itself, unfold (Botzem & Dobusch, 2012; Timmermans & Berg, 1997). The concessions and detours that result could be the subject of further research after the taxonomy becomes widely adopted.

Our study has examined the tensions in the process of constructing the IFRS Taxonomy. The setting is different to that of prior studies which analysed the problematisation of accounting inscriptions required by regulation, practice or industry convention (see e.g., Dambrin & Robson, 2011; Justesen & Mouritsen, 2009). This paper has focused on the under-researched, broader inter-organisational standard-setting networks whose outcomes affect many complementary and competing technologies and the future of international corporate reporting. A limitation of our study is that, like the IFRS Taxonomy project itself, preparers and users of IFRS digital reports are currently underrepresented. Future research could contribute by specifically engaging with these actors to better understand why they are reluctant to participate.

This paper contributes important insights into the implications of tensions that arise from the different imperatives of accounting standard-setters and digital reporting technologies. Digital taxonomies are designed to facilitate the codification of business reporting for automated access, enabling 'big data' analysis (Al-Htaybat & Alberti-Alhtaybat, 2017). Despite the tensions, accounting risks becoming irrelevant if it remains in the era of PDF. The gains of the digital age for accounting come at the cost of a realignment of thinking about what should be the obligatory passage points for both accounting standards and the taxonomies that represent them.

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